REMARKS

The Office Action dated November 16, 2005 has been received and reviewed. By way of summary, Claims 1-4, 6-17 and 19-21 were pending in the application. Claims 3, 4, 12, and 22 had been withdrawn. In the present amendment, Applicant has added new Claim 23.

35 U.S.C. § 112 Rejection of Claim 20

Claim 20 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because there is no antecedent basis for the limitation "the cockpit flight controller." Applicant thanks the Examiner for his careful review of the present patent application. Applicant has amended Claim 20 herein per the Examiner's suggestion and respectfully requests that the rejection of Claim 20 be withdrawn.

35 U.S.C. § 102(b) Rejection of Claims 1-2, 6-11, 13-17, and 19-21 as Anticipated by U.S. Patent No. 4,228,386

Claims 1-2, 6-11, 13-17, and 19-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,228,386 to Griffith (the "'386 patent"). Applicant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

According to the Examiner, the '386 patent "discloses a feedback loop as seen in figure 3, a position sensor 60, flight control device...and servo actuator 32." However, Applicant respectfully submits that the '386 patent does not teach each and every element of the independent claims of the present application. For example, an aspect of the force-feel systems claimed in the present application is that a feedback loop is provided around a cockpit-flight-controller (e.g., a pilot's controller or "stick") so as to provide feedback to a user (e.g., pilot) of the cockpit-flight-controller. The feedback to the cockpit-flight-controller allows the force-feel system to be used without a mechanical spring and a trim motor.

By way of contrast with the present application, the '386 patent teaches a feedback loop that is around the control surface 18 (figure 2). In an engaged mode (e.g., a stability augmentation system or SAS mode), there is no direct mechanical input to output connection between the pilot's control stick 16 and the control surface 18. Col. 4, lines 46-50. In this mode, SAS commands are applied through the servo amplifier 72, which drives the motor 52 and the control surface 18. See col. 5, lines 3-5. Feedback around the control surface 18 is provided by a position sensor 64 that measures the position of the control surface 18 and provides that position information back to the servo amplifier 72 and motor 52. However, the position sensor 60 referred to by the Examiner is used, in the absence of SAS commands, to drive the motor 52 that controls the control surface 18 such that the input and output remain synchronized (col. 4, lines 63-68) and is not part of a feedback loop that provides feedback to the pilot's control stick 16. Rather, the "output moves without disturbing the input, that is, no feedback to the pilot control stick 16. In this manner, the unit functions as series actuator providing SAS control without feedback to the pilot." Col. 5, lines 7-11 (emphasis added).

In a disengaged mode, the automatic controls are disengaged and the pilot's control 16 is connected through the input 12 directly to the output 14 and the control surface 18 such that there is "a one-to-one input/output drive ratio for direct pilot control of the aircraft control member." Col. 4, lines 35-40. Thus, there is no feedback to the pilot's control 16 in the disengaged mode.

Thus, the '386 patent does not teach or suggest "a feedback loop around a cockpit-flight-controller, the feedback loop configured to apply a force to the cockpit-flight-controller proportional to a deflection of the cockpit-flight-controller from a first position, the feedback loop including: a position sensor configured to measure a second position of the cockpit-flight-controller; a flight control device coupled to the position sensor, the flight control device configured to calculate the deflection and to determine the force based on a shaping function; and a servo-actuator mechanically connected to and in parallel with a flight control system, the servo-actuator configured to apply the force to the cockpit-flight-controller and to be back-driven by the cockpit-flight-controller," as recited, among other things, in Claim 1. (Emphasis added).

Regarding Claim 6, the '386 patent does not teach or suggest, among other things, "an actuator coupled to the flight control device, the actuator being mechanically coupled to and in parallel with the cockpit-flight-controller and the control surface." (Emphasis added).

As discussed above, the '386 patent teaches a series actuator that does not provide feedback to the pilot's controller. See Col. 5, lines 7-11; see also figures 2 and 3 (showing the servo motors 52 and 54 coupled between the pilot's controller 12 and the control surface 18).

Regarding Claim 19, the '386 patent does not teach or suggest a "force-feel system for a helicopter comprising: first means mechanically coupled to a control surface for allowing a user to command the control surface; second means for determining a deflection of the first means; and third means coupled to and in parallel with the first means for providing feedback to the first means, wherein the feedback is proportional to the deflection." Emphasis added.

Thus, Applicant respectfully requests that the anticipation rejection of independent Claims 1, 6 and 19 based on the '386 patent be withdrawn. Further, Applicant requests that the rejection of Claims 2, 7-11, 13-17, and 20-21 be withdrawn because, among other reasons, they respectively depend from Claims 1, 6, and 19.

35 U.S.C. § 102(b) Rejection of Claims 6-11, 13-15, 17, and 19-20 as Anticipated by U.S. Patent No. 4,345,195

Claims 6-11, 13-15, 17, 19, and 20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,345,195 to Griffith et al. (the "'195 patent"). Applicant respectfully traverses this rejection, as hereinafter set forth.

Similar to the '386 patent discussed above, the '195 patent teaches using a series servo actuator. See, for example, the "series actuator" shown in figure 2b. See also col. 2, lines 13-24 (stating that the "invention comprises electromechanical actuator apparatus...for providing multiple functions of series servo actuation...."). See also, col. 7, lines 56-65 (stating that "[s]eries servo command outputs of computers 87 and 88 are applied to servo amplifiers 89 and 90 where they are summed with surface position feedback signals from synchros 66 and 67 and effective surface rate signals from tachometers 60' and 61'. The servo amplifier outputs are supplied to series servo motors 60 and 61....").

As discussed above, the claimed subject matter of the present invention involves an actuator coupled parallel with a cockpit-flight-controller. Thus, Applicant respectfully requests that this rejection be withdrawn.

35 U.S.C. § 102(b) Rejection of Claims 1, 6, and 19-20 as Anticipated by U.S. Patent No. 4,664,346

Claims 1, 6, 19, and 20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,664,346 to Koenig (the "'346 patent"). Applicant respectfully traverses this rejection, as hereinafter set forth.

According to the Examiner, the '346 patent teaches "a servo actuator designed to be backdriven as seen in figure 3 at number 3." However, Applicant respectfully submits that the servo motor 3 cannot be backdriven by the steering column 1. Instead of backdriving the servo motor 3, moving the steering column 1 simply serves to compress or extend the spring 2. Applicant further submits that the electronics shown in figure 3 of the '346 patent simply serves to reposition the servo motor 3 to vary the tension on the spring 2. By contrast to the '346 patent, Claim 1 of the present application states, among other things, that the servo-actuator is configured to be backdriven by the cockpit-flight-controller.

Regarding Claim 6, the '346 patent does not teach or suggest, among other things, "an actuator coupled to the flight control device, the actuator being mechanically coupled to and in parallel with the cockpit-flight-controller and the control surface." (Emphasis added). The '346 patent teaches a trim servo actuator in which the actuator is not mechanically coupled to and in parallel with the steering column 1.

Regarding Claim 19, the '346 patent does not teach or suggest a "force-feel system for a helicopter comprising: first means mechanically coupled to a control surface for allowing a user to command the control surface; second means for determining a deflection of the first means; and third means coupled to and in parallel with the first means for providing feedback to the first means, wherein the feedback is proportional to the deflection." Emphasis added.

While Applicant respectfully disagrees that the claims are anticipated by the '346 patent, Applicant has taken the Examiner's suggestion and added new Claim 23 that includes the limitation "wherein the force-feel system does not include a mechanical spring or a trim motor."

Conclusion

Applicant has endeavored to address all of the Examiner's concerns as expressed in the Office Action. In view of the remarks presented herein, applicant respectfully submits that the claims are in condition for allowance, and such allowance is respectfully requested. If

further issues remain to be resolved, Applicant's attorney of record hereby formally requests a telephone interview with the Examiner. Applicant's attorney, Stephen C. Jensen, can be reached at the number listed below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,
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